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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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10/598,663

09/07/2006

Andy Ziegler

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PHILIPS INTELLECTUAL PROPERTY & STANDARDS  
595 MINER ROAD  
CLEVELAND, OH 44143

EXAMINER

TANINGCO, ALEXANDER H

ART UNIT

PAPER NUMBER

2882

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PAPER

**Please find below and/or attached an Office communication concerning this application or proceeding.**

The time period for reply, if any, is set in the attached communication.

<b>Office Action Summary</b>	<b>Application No.</b> 10/598,663	<b>Applicant(s)</b> ZIEGLER, ANDY	
	<b>Examiner</b> ALEXANDER H. TANINGCO	<b>Art Unit</b> 2882	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

### Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

### Status

- 1) ☒ Responsive to communication(s) filed on 07 September 2006.
- 2a) ☐ This action is **FINAL**.                      2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

### Disposition of Claims

- 4) ☒ Claim(s) 1-12 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-12 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

### Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 07 September 2006 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

### Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All    b) ☐ Some \*    c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

### Attachment(s)

- |  |   |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892)            | 4) <input type="checkbox"/> Interview Summary (PTO-413)           |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948)   | Paper No(s)/Mail Date. _____                                      |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08) | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| Paper No(s)/Mail Date <u>09/07/2006</u> .  | 6) <input type="checkbox"/> Other: _____                          |

## **DETAILED ACTION**

### ***Specification***

The specification is objected to because it refers to claims 1-12, which may create discrepancies and new matter issues if future claim amendments were to be made. Therefore, the examiner suggests removing all references to the claims that are in the specification.

Appropriate correction is required.

### ***Claim Rejections - 35 USC § 101***

35 U.S.C. 101 reads as follows:

Whoever invents or discovers any new and useful process, machine, manufacture, or composition of matter, or any new and useful improvement thereof, may obtain a patent therefor, subject to the conditions and requirements of this title.

Claim 12 is rejected under 35 U.S.C. 101 because the claimed invention is directed to non-statutory subject matter.

The claims are drawn to a computer program per se. Computer programs per se are abstract instructions. Therefore, a computer program is not a physical thing (product) nor a process as they are not “acts” being performed. As such, these claims are not directed to one of the statutory categories of invention (See MPEP 2106.01), but are directed to nonstatutory functional descriptive material.

It is noted that computer programs embodied on a computer readable medium or other structure, which would permit the functionality of the program to be realized, would be directed to a product and be within a statutory category of invention, so long as the computer readable medium is not disclosed as non-statutory subject matter per se (signals or carrier waves).

For examination purposes the examiner will interpret “computer program” as computer readable medium.

Appropriate correction is required.

***Claim Rejections - 35 USC § 102***

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

Claims 1-6 and 8 are rejected under 35 U.S.C. 102(b) as being anticipated by Elbakri et al. (US 6,507,633).

**With regards to claim 1**, Elbakri et al. disclose a method comprising the step of: reconstructing an image of the object of interest on the basis of the data set (Col. 5 Lines 41-45); wherein a statistical weighing is performed during reconstruction of the image (Col. 5 Lines 54-56).

**With regards to claim 2**, Elbakri et al. disclose a method comprising a step wherein the data set is a projection data set acquired by means of a source of electromagnetic radiation generating a beam and by means of a radiation detector detecting the beam (Col. 5 Lines 55-59; Fig. 1).

**With regards to claim 3**, Elbakri et al. disclose a method comprising a step wherein the source of electromagnetic radiation is a polychromatic x-ray source (Col. 5 Line 58); wherein the source moves along a helical path around the object of interest

(Col. 1 Line 51); and wherein the beam has one of a cone beam geometry and a fan beam geometry (Col. 1 Lines 48-54).

**With regards to claim 4**, Elbakri et al. disclose a method comprising a step wherein the reconstruction of the image is performed on the basis of an iterative algorithm comprising a plurality of update steps until an end criterion has been fulfilled (Abs.).

**With regards to claim 5**, Elbakri et al. disclose a method comprising a step wherein the iterative algorithm is a maximum likelihood algorithm (Col. 8 Line 21); wherein the reconstructed image has the highest likelihood (Col. 8 Line 21); and wherein the weighing is performed in each update step of the plurality of update steps (Col. 8 Line 59 – Col. 9 Line 55).

**With regards to claim 6**, Elbakri et al. disclose a method comprising the step of: determining a number of detected photons during acquisition of the data set (Col. 8 Lines 13-15); wherein the weighing is based on a statistical error of the number of detected photons (Col. 14 Lines 45-50).

**With regards to claim 8**, Elbakri et al. disclose a method comprising a step wherein the reconstruction of the image is based on a sub-set of at least two projections of all acquired projections of the projection data set (Col. 5 Lines 61-63).

### ***Claim Rejections - 35 USC § 103***

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the

invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Claim 7 is rejected under 35 U.S.C. 103(a) as being unpatentable over Elbakri et al. (US 6,507,633) as applied to claim 5 above, and further in view of Lange et al. (Globally Convergent Algorithms for Maximum a Posteriori Transmission Tomography).

**With regards to claim 7**, Elbakri et al. disclose a method as recited above in claim 5. Elbakri et al. teach a method comprising maximum likelihood and Poisson distribution (Col. 8 Lines 1-24; Col. 11 Line 21 – Col. 12 Line 15; Equations 9 and 10-28). Elbakri et al. fail to explicitly teach a method comprising the step of: determining a number of detected photons  $Y_i$  during acquisition of the data set; wherein the weighing is based on a statistical error  $\sigma_{Y_i}$  of the number of detected photons  $Y_i$ ; wherein an update of an attenuation parameter  $\mu_j^{n+1}$  is calculated from the attenuation parameter  $\mu_j^n$

$$\mu_j^{n+1} = \mu_j^n + \mu_j^n \frac{\sum_i l_{ij} \frac{\sum_i l_{ij} [d_i e^{-\sum_j l_{ij} \mu_j^n} - Y_i] / \sigma_{Y_i}^2}{\sum_i l_{ij} / \sigma_{Y_i}^2}}{\sum_i l_{ij} \langle l_{ij}, \mu^n \rangle d_i e^{-\sum_j l_{ij} \mu_j^n}}$$

by

wherein  $d_i$  is a number of photons emitted by the source of radiation;

wherein  $l_{ij}$  is a basis function of an  $i$ -th projection;

wherein  $l_i$  is a vector of basis functions  $l_{ij}$  of the  $i$ -th projection;

and wherein  $\langle l_i, \mu \rangle = \sum_j l_{ij} \mu_j$  is an inner product.

Lange et al. teach a method comprising the step of: determining a number of detected photons  $Y_i$  during acquisition of the data set; wherein the weighing is based on

a statistical error  $\sigma_{Y_i}$  of the number of detected photons  $Y_i$ ; wherein an update of an attenuation parameter  $\mu_j^{n+1}$  is calculated from the attenuation parameter  $\mu_j^n$  by

$$\mu_j^{n+1} = \mu_j^n + \mu_j^n \frac{\sum l_i \frac{\sum l_i [d_i e^{-\mu_j^n} - Y_i] / \sigma_{Y_i}^2}{\sum l_i / \sigma_{Y_i}^2}}{\sum l_i \langle l_i, \mu^s \rangle d_i e^{-\mu_j^n}}$$

(Equations 1-7). It would have been obvious to one of ordinary skill in the art, at the time of invention to modify the invention of Elbakri et al. to include the features of Lange et al. One would have been motivated to make such a modification to reduce artifact thus improving image quality as implied by Lange et al.

Claims 9-12 are rejected under 35 U.S.C. 103(a) as being unpatentable over Elbakri et al. (US 6,507,633) in view of August (US 2003/0219152).

**With regards to claims 9, 11, and 12**, Elbakri et al. disclose a data processing device, comprising: a memory for storing a data set of an object of interest (Fig. 1); a data processor for performing artifact correction in the data set of the object of interest, wherein the data processor is adapted for performing the following operation (Fig. 1; Abs.): reconstructing an image of the object of interest on the basis of the data set (Fig. 1; Col. 5 Lines 41-45); wherein a statistical weighing is performed during reconstruction of the image (Col. 5 Lines 54-56; Fig. 1). Elbakri et al. fail to explicitly teach an apparatus wherein a data processor is adapted for performing the following operation: loading the data set. August teaches an apparatus wherein a data processor is adapted for performing the following operation: loading the data set [0050; Fig 2 note: **50**]. It would have been obvious to one of ordinary skill in the art, at the time of invention to

modify the invention of Elbakri et al. to include a computer readable medium as taught by August. One would have been motivated to make such a modification to more easily update existing systems to implement the invention as implied by August.

**With regards to claim 10**, Elbakri et al. as modified above disclose a data processing device wherein the reconstruction of the image is performed on the basis of an iterative algorithm comprising a plurality of update steps until an end criterion has been fulfilled (Abs.); wherein the iterative algorithm is a maximum likelihood algorithm; wherein the reconstructed image has the highest likelihood (Col. 8 Line 21); and wherein the weighing is performed in each update step of the plurality of update steps (Col. 8 Line 59 – Col. 9 Line 55).

### ***Conclusion***

Any inquiry concerning this communication or earlier communications from the examiner should be directed to ALEXANDER H. TANINGCO whose telephone number is (571)272-8048. The examiner can normally be reached on Mon-Fri 8:00-4:30 EST.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Ed Glick can be reached on (571) 272-2490. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.



Art Unit: 2882

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/Alexander H Tanningco/  
Examiner, Art Unit 2882

/Courtney Thomas/  
Primary Examiner, Art Unit 2882